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IS : 4063 - 1982  
( Reaffirmed 1995 )

*Indian Standard*  
SPECIFICATION FOR  
FUSE BOX FOR AUTOMOBILES  
( *First Revision* )

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**BUREAU OF INDIAN STANDARDS**  
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG  
NEW DELHI 110002

# Indian Standard

## SPECIFICATION FOR FUSE BOX FOR AUTOMOBILES

### ( First Revision )

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*Indian Standard*  
SPECIFICATION FOR  
FUSE BOX FOR AUTOMOBILES  
( *First Revision* )

0. FOREWORD

**0.1** This Indian Standard (First Revision) was adopted by the Indian Standards Institution on 25 August 1982, after the draft finalized by the Automotive Electrical Equipment Sectional Committee had been approved by the Electrotechnical Division Council.

**0.2** This standard was first published in 1967. The present revision has been undertaken to update the contents, and to introduce various environmental tests and the endurance test.

**0.3** This standard is intended to cover the requirements and methods of tests for fuse box for use in automobile wiring and equipment.

**0.4** In view of the importance of achieving interchangeability, this standard lays down dimensions also, in addition to the performance requirements and methods of tests.

**0.5** Fuse links conforming to the following standards are suitable for use with the fuse box specified in this standard:

IS : 2577-1974 Specification for cartridge fuselinks for automobiles  
(*first revision*)

IS : 7528-1974 Specification for porcelain (moulded) fuse links for automobiles.

**0.6** For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test, shall be rounded off in accordance with IS: 2-1960\*. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

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\*Rules for rounding off numerical values (*revised*).

## **1. SCOPE**

**1.1** This standard covers the requirements and methods of tests for fuse box for use in automobile wiring and equipment.

**1.2** The fuse box is suitable for use with fuse links conforming to IS : 2577-1974\* or IS : 7528-1974†.

## **2. TERMINOLOGY**

**2.0** For the purpose of this standard, the following definitions shall apply.

**2.1 Rated Current** — The current stated by the manufacturer that the fuselinks used in the fuse box, will carry continuously without deterioration in accordance with this standard.

**2.2 Type Tests** — Tests carried out to prove conformity with the specification. These are intended to prove the general qualities and design of a given type of fuse box.

**2.3 Acceptance Tests** — Tests carried out on the samples taken from a lot for the purpose of acceptance of the lot.

**2.4 Routine Tests** — Tests carried out on each fuse box to check requirements which are likely to vary during production.

## **3. MATERIAL AND CONSTRUCTION**

**3.1 Material** — The body or base of the fuse box shall be made of non-conductive material, which shall be non-inflammable, non-hygroscopic, and unbreakable under normal use. The screw holes in the moulding may be reinforced, if necessary, with metal inserts.

**3.1.1** All threaded metal inserts provided in the moulding shall withstand a tightening torque of 10 Nm.

**3.2** The holder clips shall be made of good conductivity material like phosphor bronze, brass or steel, suitably hardened to have spring quality, and suitably plated to protect against corrosion.

**3.3** The fuse box shall be designed to carry one or more fuse links of the types covered in IS : 2577-1974\* or IS : 7528-1974†, side by side, keeping a minimum spacing *S* of 15 mm between centre lines ( see Fig. 1 ).

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\*Specification for cartridge fuse-links for automobiles (*first revision* ).

†Specification for porcelain (moulded) for fuse links for automobiles.



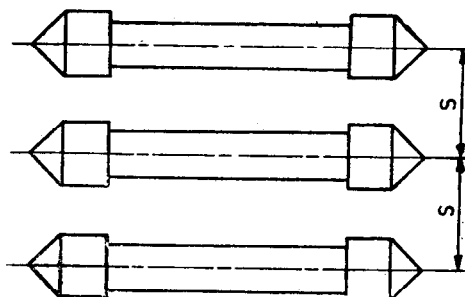


FIG. 1 SPACING OF FUSE CLIPS

3.4 The terminals may be made integral with the clips. The clips, when they are of jaws type, shall have an inner diameter of 6.35 mm and the minimum height  $H$  (see Fig. 2) as given below:

Rated Current of Fuse Link in A		Minimum Height of Clip $H$ in mm
Over	Up to	
—	6	8
6	15	9
15	40	10

NOTE — For representation purposes, conical ended fuse-links are shown in Fig. 1 and Fig. 2. Values of  $S$  and  $H$  are to be adhered to for other types of fuse links also.

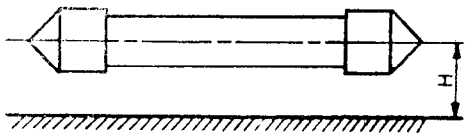


FIG. 2 MINIMUM HEIGHT OF FUSE CLIPS

3.5 The fuse box shall be provided with suitable mounting arrangement so that the screws holding the box on its base are easily accessible with a screwdriver. The mounting and overall dimensions of the fuse box shall be as given in Fig. 3.

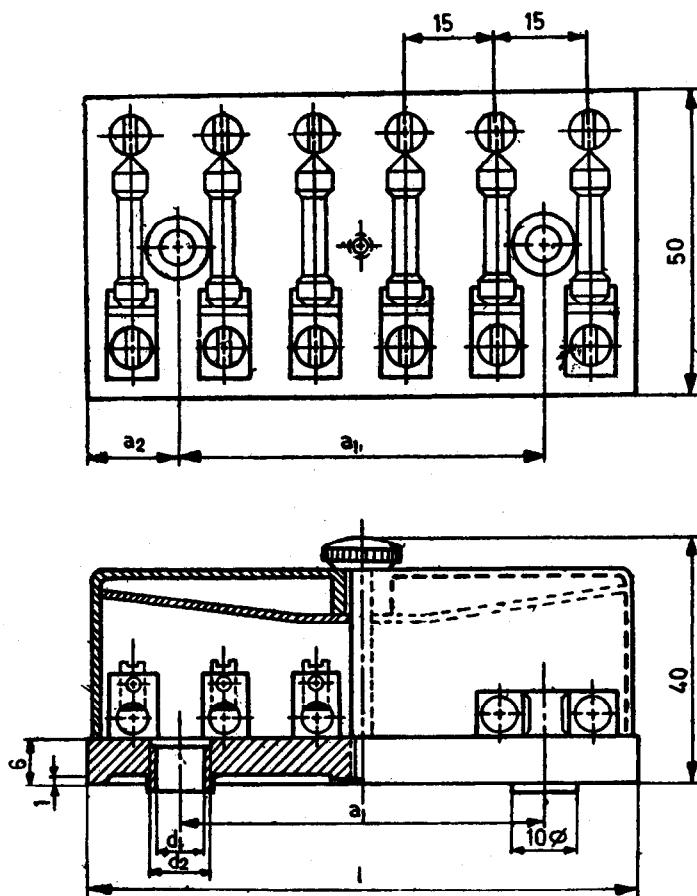


FIG. 3 MOUNTING AND OVERALL DIMENSIONS OF FUSE BOX

<i>Number of Fuse Links</i>	$a_1$ mm	$a_2$ mm	$l$ mm	$d_1$ mm	$d_2$ mm
2	17	9	35	4.8	8
3	30	7.5	45	4.8	8
4	45	10	65	4.8	8
6	60	15	90	5.8	10
8	90	15	120	5.8	10

**3.6** The clips shall be springy enough to grip tightly a cartridge fuse-link conforming to IS : 2577-1974\* or a porcelain (moulded) fuse-link conforming to IS : 7528-1974† and at the same time permit easy insertion and withdrawal by application of a force within the limits specified in 5.4.1.

**3.7** The fuse box may be provided with a suitable cover of non-inflammable material and the cover shall be so fitted as to permit easy removal and fitment. In fitted condition there shall be minimum 3 mm clearance between the clips and the cover. If required by the purchaser, the cover shall be of suitable transparent material, in which case it shall be properly marked with the terminal locations.

#### 4. MARKING

**4.1** The fuse box shall be suitably marked with the following information:

- a) Manufacturer's name or trade-mark,
- b) Rated current,
- c) Number or code of poles, and
- d) Month and year of manufacture.

**4.1.1** The fuse boxes may also be marked with Standard mark.

**4.1.2** The use of the Standard Mark is governed by the provisions of the Bureau of Indian Standards Act, 1986 and the Rules and Regulations made thereunder. The details of conditions under which the licence for the use of Standard Mark may be granted to manufacturers or producers may be obtained from the Bureau of Indian Standards.

#### 5. TESTS

##### 5.1 Classification of Tests

**5.1.1 Type Tests** — The following shall constitute type tests:

- a) Visual examination and dimensional check ( see 5.2 ),
- b) Millivolt drop test ( see 5.3 ),

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\*Specification for cartridge fuse-links for automobiles (*first revision*).

†Specification for porcelain (moulded) fuse links for automobiles.

- c) Fuse link insertion/extraction test ( *see* 5.4 ),
- d) High voltage test ( *see* 5.5 ),
- e) Vibration test ( *see* 5.6 ),
- f) Dry heat test ( *see* 5.7 ),
- g) Cold test ( *see* 5.8 ),
- h) Damp heat (cycling) test ( *see* 5.9 ),
- j) Change of temperature test ( *see* 5.10 ),
- k) Dust test ( *see* 5.11 ),
- m) Water spray test ( *see* 5.12 ),
- n) Corrosion resistance test ( *see* 5.13 ),
- p) Contamination resistance test ( *see* 5.14 ),
- q) Drop test ( *see* 5.15 ), and
- r) Endurance test ( *see* 5.16 ).

**5.1.1.1** *Criteria for approval* — Ten samples shall be submitted for testing together with the relevant data. The testing authority shall issue a type approval certificate if the fuse boxes are found to comply with the requirements of tests given in 5.1.1.

**5.1.1.2** All samples shall be tested for:

- a) visual examination and dimensional check ( *see* 5.2 ),
- b) millivolt drop test ( *see* 5.3 ),
- c) fuse link insertion/extraction test ( *see* 5.4 ), and
- d) high voltage test ( *see* 5.5 ).

**5.1.1.3** The samples shall then be subjected to tests in the following manner:

<i>Tests</i>	<i>No. of Sample(s)</i>
a) Vibration test ( <i>see</i> 5.6 )	1
b) Dry heat test ( <i>see</i> 5.7 )	1
c) Damp heat (cycling) test ( <i>see</i> 5.9 )	
d) Cold test ( <i>see</i> 5.8 )	1
e) Change of temperature test ( <i>see</i> 5.10 )	

<i>Tests</i>	<i>No. of samples(s)</i>
f) Dust test ( <i>see</i> 5.11 )	1
g) Water spray test ( <i>see</i> 5.12 )	
h) Corrosion resistance test ( <i>see</i> 5.13 )	1
j) Contamination resistance test ( <i>see</i> 5.14 )	1
k) Drop test ( <i>see</i> 5.15 )	
m) Endurance test ( <i>see</i> 5.16 )	4

**5.1.1.4** In case of failure of one or more samples in type tests, the testing authority may call for fresh samples not exceeding twice the number of original samples and subject them to the test(s) in which failure occurred. If in repeat test(s) no failure occurs, the tests may be considered to have been satisfied.

**5.1.2 Acceptance Tests** — The following shall constitute acceptance tests:

- Visual examination and dimensional check ( *see* 5.2 ),
- Millivolt drop test ( *see* 5.3 ),
- Fuse link insertion/extraction test ( *see* 5.4 ), and
- High voltage test ( *see* 5.5 )

**NOTE** — The number of samples for acceptance test shall be as agreed upon between the purchaser and the manufacturer.

**5.1.3 Routine Tests** — The following shall constitute routine tests:

- Visual examination and dimensional check ( *see* 5.2 ), and
- Fuse link insertion/extraction test ( *see* 5.4 ).

**5.2 Visual Examination and Dimensional Check** — The fuse box shall be examined for fitment dimensions and finish. They shall show no signs of cracks, burrs and other unwanted protruding materials. They shall conform to the requirement in 3.3 and 3.4.

**5.3 Millivolt Drop Test** — The appropriate fuse link shall be mounted in the fuse box and a current equal to 50 percent of the rated capacity shall be passed. The millivolt drop when measured between the holder clip and the fuse cap shall not be more than 1.5 millivolt per ampere.

#### **5.4 Fuse Link Insertion/Extraction Test**

**5.4.1** A fuse link of the same rated current as the fuse holder shall be used to measure the force required to insert it into and then extract from the holder:

- a) For cartridge fuse-links the force of insertion shall not exceed 50 N and shall not be less than 15 N. The force of extraction shall be within the limits of 15 N and 35 N.
- b) For porcelain ( moulded ) fuse-links the force of insertion shall not exceed 15 N and shall not be less than 10 N. The force of extraction shall be within the limits of 15 N and 35 N.

**5.4.2** The insertion and extraction shall be repeated 30 times and clips shall not show any weakening of the insertion and extraction forces.

**5.4.3** After the test the fuse box shall satisfy the requirements of millivolt drop test ( 5.3 ).

**5.5 High Voltage Test** — The fuse box shall be subjected to an ac voltage of 240 V rms at a convenient frequency between 40 and 60 Hz for a period of 1 minute between any terminal post and metal inserts for mounting screws. The fuse box shall satisfactorily withstand this test without arcing or puncture.

**5.6 Vibration Test** — The fuse box with fuse link in position, after being rigidly mounted on a suitable vibrating machine constructed to produce simple harmonic motion shall be subjected to vibrate (a total lift of 0.75 mm) through a frequency range of 10-55-10 Hz in a period of one minute. With continuously varying frequencies, the vibration shall be applied for not less than one hour in each of the three major axes of the box. At the end of the vibration test the fuse box shall be examined for any evidence of damage and shall satisfy the requirement of the fuse link insertion/extraction test (5.4) and millivolt drop test (5.3).

**5.7 Dry Heat Test** — The test shall be conducted according to IS : 9000 (Part III/Sec 3)-1977\*. The test chamber temperature shall be 85°C and the duration of exposure shall be 4 hours. The fuse box shall be fitted with an appropriate fuse link during the test.

**5.7.1** After the test the fuse box shall be examined for any crack or distortion of shape and shall satisfy the requirements of millivolt drop test ( see 5.2 ).

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\*Specification for basic environmental testing procedures for electronic and electrical items : Part III Dry heat test, Section 3 Dry heat test for non heat dissipating items with gradual change of temperature.

**5.8 Cold Test** — The test shall be conducted according to IS : 9000 (Part II/Sec 3)-1977\*. The test chamber temperature shall be  $-10^{\circ}\text{C}$  and the duration of exposure shall be 2 hours. The fuse box shall be fitted with an appropriate fuse link during the test.

**5.8.1** After the test the fuse box shall be examined for any crack or distortion of shape and shall satisfy the requirements of the millivolt drop test ( 5.3 ).

**5.9 Damp Heat ( Cycling ) Test** — The test shall be conducted as specified in IS : 9000 (Part V/Sec 2)-1981\*. The number of conditioning cycles shall be 7.

**5.9.1** After the test the fuse box shall show no sign of corrosion, deterioration or damage and shall satisfy the requirements of millivolt drop test ( 5.3 ).

**5.10 Change of Temperature Test** — The test shall be conducted according to IS : 9000 (Part XIV)-1978\*.

**5.10.1** The temperature severity shall be as given below:

Cold ( <i>Min</i> ) temperature	$10^{\circ}\text{C}$ ,
Hot ( <i>Max</i> ) temperature	$85^{\circ}\text{C}$ ,
Number of cycles	5, and
Duration ( $t_1$ )	1 hour.

**5.10.2** At the end of this test the fuse box shall show no sign of damage and shall pass millivolt drop test (5.3).

**5.11 Dust Test** — The fuse box shall be mounted in its normal operating position 150 mm from the wall in a box measuring 900 mm in all directions, containing 5 kg of fine powdered cement conforming to IS : 269-1976†. At intervals of 15 minutes, this dust shall be agitated using compressed air or fan blower, by projecting blasts of air for a two-second period in a downward direction into the dust in such a way that the dust shall be completely and uniformly diffused throughout the entire cube. The dust is then allowed to settle. This test shall be continued for 5 hours.

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\*Specification for basic environmental testing procedures for electronic and electrical items:

Part II Cold test, Section 3 Cold test for non heat dissipating items with gradual change of temperature.

Part V Damp heat (cycle) test, Section 2  $12 \times 12$  h cycle.

Part XIV Change of temperature.

†Specification for ordinary and low heat portland cement ( *third revision* ).

## **IS : 4063 - 1982**

**5.11.1** After the test the fuse box shall meet the requirements of millivolt drop test ( 5.3 ).

**5.12 Water Spray Test** — The test shall be conducted in accordance with IS : 2106 (Part XI)-1965\*. The duration of the test shall be 2 hours.

**5.12.1** The fuse box, after the test, shall satisfy the requirements of millivolt drop test ( 5.3 ).

**5.13 Corrosion Resistance Test** — The test shall be conducted as specified in Appendix A.

**5.13.1** After the test the fuse box shall satisfy the requirements of millivolt drop test ( 5.3 ).

**5.14 Contamination Resistance Test** — The fuse box shall be sprayed with contaminants like diesel, petrol, thinner, lubricating oil and break fluid. The fuse box shall neither react with nor dissolve in the contaminants.

**5.15 Drop Test** — The test shall be carried out as specified in IS : 9000 ( Part VII/Sec 3 )-1979†. The fuse box shall be dropped 6 times in different orientations from a minimum height of 300 mm. There shall be no damage or distortion of parts.

**5.16 Endurance Test** — The fuse box shall be fitted with an appropriate fuse link. A current equal to 110 percent of the rated current shall be passed for 1 000 hours. The test may be carried out at any convenient voltage. The test current shall be maintained within  $\pm 2$  percent during the test. The minimum duration of continuous run of the test shall be not less than 30 minutes. There shall be no failure during the test.

**5.16.1** After the test the fuse box shall be tested for millivolt drop test ( 5.3 ). The value of millivolt drop shall not be more than 2.0 millivolt per ampere.

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\*Specification for environmental tests for electronics and electrical equipment : Part XI Water spray test.

†Specification for basic environmental testing procedures for electronic and electrical items : Part VII Impact test, Section 3 Drop and topple.



## APPENDIX A

( Clause 5.13 )

### TEST FOR CORROSION RESISTANCE

#### A-1. PROCEDURE

**A-1.0** The ability of the fuse box with fuses in position, to withstand corrosion due to atmospheric conditions shall be assessed by the following test.

**A-1.1** The chamber for this test shall be so constructed that the salt spray is produced in the lower part of the chamber, in the upper part of which the parts to be exposed are suspended.

**A-1.2** The spray shall be produced by an atomiser employing compressed air free from all impurities.

**A-1.3** The ceiling, the walls and all other parts of the chamber shall be so constructed and the parts under test so arranged that no condensate can drip on the test specimen.

**A-1.4** The salt solution shall be a 5 percent solution of sodium chloride in water.

**A-1.5** The device shall be sprayed in such a chamber at the standard temperature of 27°C, for 50 hours consisting of two periods of 24 hours each and one hour drain.

**A-1.6** After removal from the salt spray chamber, the parts shall not show any sign of corrosion or electrolytic action.

**A-1.7** In general, a salt spray chamber shown in Fig. 4 with a spraying arrangements as shown in Fig. 5 and complying with the following requirements would be suitable.

- a) The cabinet should approximately be of the dimensions shown, and the cabinet and its internal fittings should be made of monel metal or any other suitable material. A shelf is required, which should be capable of being fitted in the upper or lower part of the cabinet;
- b) The air used for atomizing the salt solution shall be clean. The pressure during the tests shall be between 29 and 35 kKa. The pressure may be adjusted by a relief valve or by the pressure outlet of the blower;

- c) The nozzle for atomizing the salt solution shall be adjusted for maximum amount of spray. This adjustment may be carried out by unscrewing the bottom lock nut *B*, on the lower nozzle *C*, and adjusting this nozzles into position until maximum spray occurs. The diameter of the nozzle shall be 1.5 mm. A tap and second branch in the air line is available for agitating the salt solution as required;
- d) The spraying apparatus shall be capable of atomizing not less than 1 450 ml salt solution per hour. The quantity of solution sprayed per cubic metre capacity of the test chamber shall be approximately 177 ml per minute; and
- e) The container filled with cotton wool acts as a breather and provides an outlet for the air which is constantly being pumped into the chamber, the cotton wool acting as a filter and preventing salt mist from being discharged into the atmosphere.

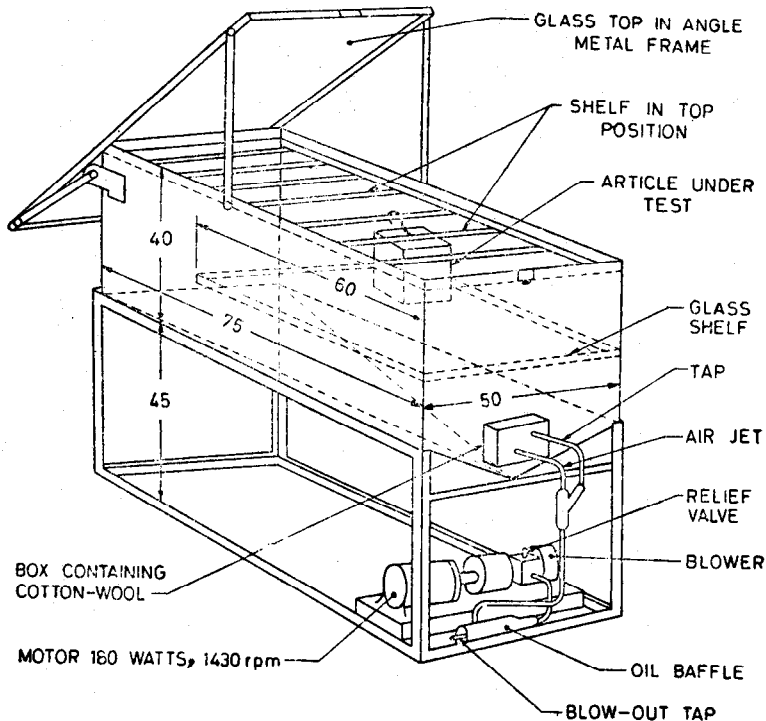


FIG. 4 SALT SPRAY CHAMBER

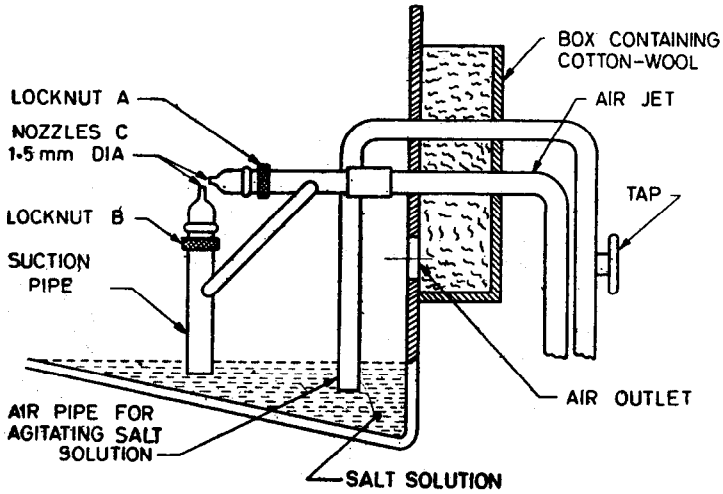


FIG. 5 DETAILS OF SPRAYING ARRANGEMENT

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